Elk Hills Power

Via Electronic Mail and FedEx

January 21, 2015

Michele Dermer
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Re: Requested information
Underground Injection Control (UIC) - Aquifer Exemption
Class I Non-Hazardous Wells
Elk Hills Power – R9UIC-CA1-FY10-2R

Dear Ms. Dermer:

Elk Hills Power is submitting the attached documents per your request during our discussion last January 8, 2015. Attachment A is the list of all injection wells and their corresponding depths in close proximity to the Elk Hills Power injection well. Attachment B is the Map of Elk Hills field; circled and highlighted on the map is the Elk Hills Power 18-G injection well location and the nearby injection well location 13B and 17G.

Also during our discussion, you requested us to provide a list of documents citing the aquifer exemption in the Elk Hills field. The attachments from C to F are the documents citing the aquifer exemption in the Elk Hills field.

Attachment C is from Naval Petroleum Reserve No. 1 (NPR-1) Phase I Environmental Site Assessment performed in June 03, 1997 mentioning the Elk Hills Field is designated as an exempt aquifer by California Division of Oil, Gas and Geothermal Resources page 3-10.

Attachment D is the Final Supplemental Environmental Impact Statement/Program Environmental Impact Report for the sale of NPR-1, DOE/SEIS/PEIR-0158-S2, dated October 1997 page S-10 stating that the local water quality is non potable due to high total dissolved solids level.

Attachment E is a Department of Energy Document, Supplemental Environmental Impact Statement, DOE/EIS-0158 dated July 1993, pages 4.1.4-5, fifth paragraph stating, that the groundwaters are in UIC exempt aquifers which cited a 1986 Mr. Scott Smith memorandum. Mr. Scott Smith is a staff engineer of State RWQCB.

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Elk Hills Power

Attachment F is the Conference Notes with EPA Region IX, DOE and Naval Petroleum Reserves citing that the Elk Hills Tulare Formation aquifer exemption for class II disposal under the UIC program.

We hope that you can assist us in getting the aquifer exemption issue resolved and we look forward to responding to your other comments. If you have any questions, please do not hesitate to contact me at (661) 765-1801.

Very truly yours,

Bob Bond
Elk Hills Power Team Lead

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Attachment A
List of Nearby Injection Well

API	PID11	PID8	NAME	CURRENT TYPE	SECTION	Top Perf	Bottom Perf	Slotted Liner	
04029675550100	0402967555	02967555	13WD-17G-RD1	DISP_H2O	17G	466	1545	No	Converted from producer 6/2001
04030272110000	0403027211	03027211	14WD-13B	DISP_H2O	13B	752	1459	Yes	
04030250470000	0403025047	03025047	17WD-13B	DISP_H2O	13B	568	1071	Yes	
04029611390000	0402961139	02961139	21WD-17G	DISP_H2O	17G	557	1321	No	Converted from producer 5/2001
04030267470000	0403026747	03026747	24WD-13B	DISP_H2O	13B	779	1207	Yes	
04030250480000	0403025048	03025048	25WD-13B	DISP_H2O	13B	730	1411	Yes	
04030240070000	0403024007	03024007	27WD-13B	DISP_H2O	13B	565	1171	Yes	Plug & Abandoned 7/2011
04030210080000	0403021008	03021008	27WD-18G	DISP_H2O	18G	804	1799	Yes	
04030250490000	0403025049	03025049	35WD-13B	DISP_H2O	13B	760	1692	Yes	
04030210090000	0403021009	03021009	37WD-18G	DISP_H2O	18G	824	1798	Yes	
04030272140000	0403027214	03027214	44WD-13B	DISP_H2O	13B	741	1661	Yes	
04030221300000	0403022130	03022130	45WD-13B	DISP_H2O	13B	673	1277	Yes	
04030250500000	0403025050	03025050	47WD-13B	DISP_H2O	13B	684	1685	Yes	
04030272150000	0403027215	03027215	54WD-13B	DISP_H2O	13B	747	1397	Yes	
04030195120000	0403019512	03019512	54WD-18G	DISP_H2O	18G	541	1087	Yes	Plug & Abandoned, 12/2006
04030317910000	0403031791	03031791	54XWD-18G	DISP_H2O	18G	506	996	Yes	
04030318830000	0403031883	03031883	56WD-18G	DISP_H2O	18G	758	1697	Yes	
04030221310000	0403022131	03022131	57WD-13B	DISP_H2O	13B	704	1365	Yes	
04030202550000	0403020255	03020255	57WD-18G	DISP_H2O	18G	864	1696	Yes	
04029730980000	0402973098	02973098	61WD-18G	DISP_H2O	18G	447	893	Yes	
04030193810000	0403019381	03019381	64WD-18G	DISP_H2O	18G	473	1184	Yes	Plug & Abandoned, 12/2006
04030318840000	0403031884	03031884	64XWD-18G	DISP_H2O	18G	543	1356	Yes	
04030221320000	0403022132	03022132	65WD-13B	DISP_H2O	13B	564	1205	Yes	Plug & Abandoned 8/2005
04030202560000	0403020256	03020256	67WD-18G	DISP_H2O	18G	904	1764	Yes	
04029666940000	0402966694	02966694	71WD-18G	DISP_H2O	18G	428	826	No	
04030318770000	0403031877	03031877	73WD-18G	DISP_H2O	18G	600	1385	No	
04030213780000	0403021378	03021378	77WD-13B	DISP_H2O	13B	738	1436	Yes	
04029644490000	0402964449	02964449	81WD-18G	DISP_H2O	18G	448	904	No	Plug & Abandoned, 7/1990
04029292310000	0402929231	02929231	82-18G	DISP_H2O	18G	515	1650	No	Plug & Abandoned, 10/1985
04030221330000	0403022133	03022133	85WD-13B	DISP_H2O	13B	746	1438	Yes	
04030213790000	0403021379	03021379	87WD-13B	DISP_H2O	13B	594	1312	Yes	
	0402954886		84W-13B	Tulare Source	13B	1047	1890	Yes	Plug & Abandoned, 8/2005
	0403023952		25EHP-WD-18G	Class I Disp	18G	719	1745	Yes	Elk Hills Power Plt disposal well Plugged and Abandoned 9/2010
	0403023953		35EHP-WD-18G	Class I Disp	18G	696	1794	Yes	Elk Hills Power Plant Disposal Well
			25A-WD-18G	Class I Disp	18G	724	1415	Yes	Elk Hills Power Plant Disposal Well installed 01/2004
			35A-WD-18G	Class I Disp	18G	648	1289	Yes	Elk Hills Power Plant Disposal Well installed 01/ 2004
	0402965980		86W-18G	Tulare Source	18G	981	1995	Yes	Idle

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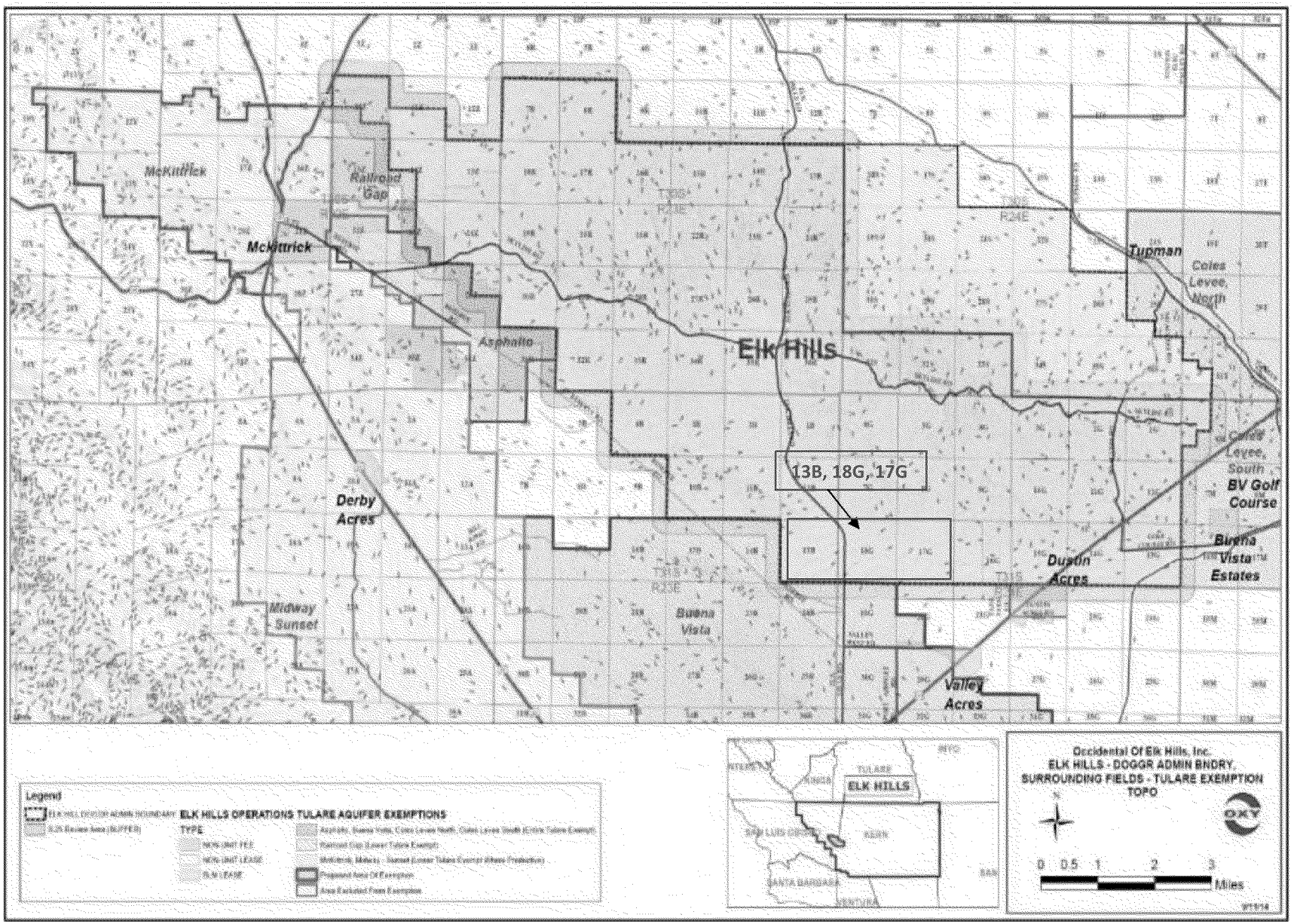
Attachment B
Map of Elk Hills Field

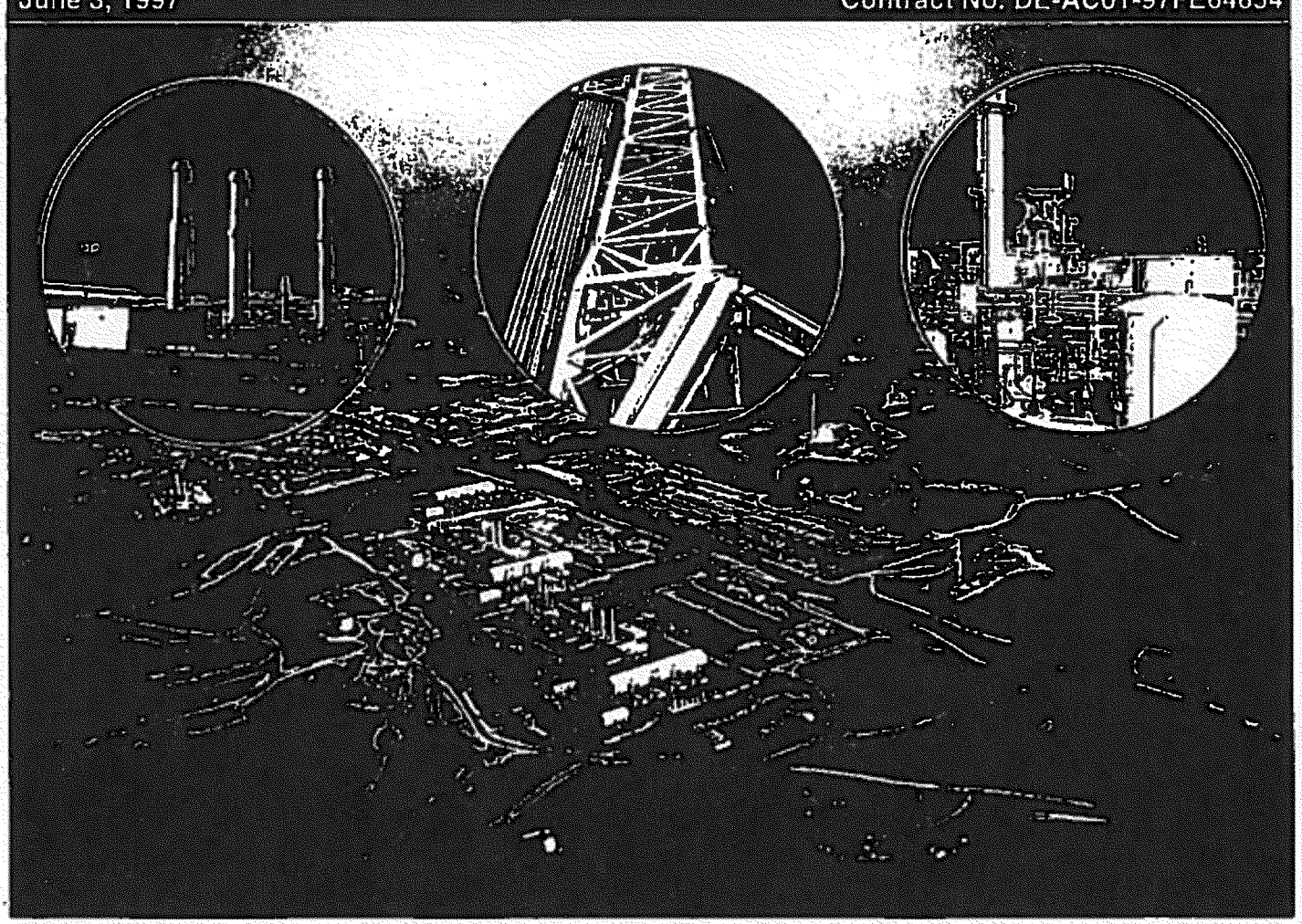

McKittrick
Railroad Gap
McKittrick
Asphalto
Elk Hills
Tupman
Coles Levee, North
Coles Levee, South
BV Golf Course
Buena Vista Estates
13B, 18G, 17G
Derby Acres
Dustin Acres
Midway Sunset
Buena Vista
Valley Acres
R24E
R23E
T30S
T31S
Legend
ELK HILLS OPERATIONS TULARE AQUIFER EXEMPTIONS
TYPE
NON-UNIT FEE
NON-UNIT LEASE
BLM LEASE
Proposed Area Of Exemption
Area Excluded From Exemption
TULARE
KINGS
ELK HILLS
KERN
SAN LUIS OBISPO
SANTA BARBARA
VENTURA
Occidental Of Elk Hills, Inc.
ELK HILLS - DOGGR ADMIN BNDRY,
SURROUNDING FIELDS - TULARE EXEMPTION
TOPO
N
0 0.5 1 2 3
Miles

Elk Hills Power

Attachment C
Naval Petroleum Reserve No. 1 (NPR-1)
Phase I Environmental Site Assessment
June 03, 1997

Naval Petroleum Reserve No. 1 (NPR-1)
Phase I Environmental Site Assessment

June 3, 1997 Contract No. DE-AC01-97FE64654



Prepared for:

Department of Energy
Office of the Assistant Secretary for Fossil Fuels

Prepared by:

AMERICAN TECHNOLOGIES, INC.

contained within the Tulare Formation is connate and not moving off the structure toward the adjacent valleys (DOE GWPMP, 1995).

Groundwater Exemption

Tulare Formation within the Elk Hills Field has been designated as an exempt aquifer by the California Division of Oil, Gas and Geothermal Resources (DOGGR) because it is hydrocarbon producing in the western part of the Reserve (30R) and it contains groundwater with a total dissolved solids content exceeding 3,000 ppm (i.e., it is not reasonably expected to supply a public water system).
NPR-1 does not operate a TSD facility and, therefore , RCRA groundwater monitoring is not performed. Studies to date of NPR-1 disposal sites and CERCLA sites do not show groundwater contamination. These studies were required by the State of California and by DOE orders.

NPR-1 completed the development of a Groundwater Monitoring Plan (GPM) in April, 1994 in accordance with DOE Order 5400.1 criteria. The plan includes water source well sampling; monitoring well design siting; design and monitoring criteria; and methods to be applied in defining the NPR-1 hydrogeologic regime.

NPR-1 has an extensive produced water injection program which is operated under the auspices of the DOGGR. Most produced water from oil field production is injected into the Tulare Zone through several Class II permitted injection wells.

Geologic formations below the Tulare zone contain saline water above 10,000 mg/L Total Dissolved Solids and do not require protection as a drinking water aquifer under the federal Safe Drinking Water Act.

The primary drinking water aquifer for this area is located northeast of NPR-1. There are no drinking water aquifers or water supply wells located around the perimeter of NPR-1. Sumping along the northeast flank of NPR-1 was discontinued in 1992 to eliminate any potential threat to the proposed Kern Fan Element (Water Recharge Area) directly east of the Reserve. An inventory of all active and inactive sumps and catchbasins, including those on the alluvium, was conducted in 1992. A total of 50 sumps and catch basins were identified for investigation. Reports indicate that all the sumps located on the alluvium have been investigated and appropriately remediated.

Elk Hills Power

Attachment D

Final Supplemental Environmental Impact Statement/ Program Environmental Impact Report
for the Sale of NPR-1
DOE/SEIS/PEIR-0158-S2
October 1997

HES DEPARTMENT
ORIGINAL

FINAL

Supplemental Environmental Impact Statement/ Program Environmental Impact Report for the Sale of NPR-1

Sale of Naval Petroleum Reserve No. 1 (Elk Hills) Kern County, California

DOE/SEIS/PEIR-0158-S2

October 1997

Volume II

Air Quality

The third major impact from the future development of NPRs would be the possibility that state ambient air quality standards for PM_{10} could be exceeded off-site and on-site Federal ambient air quality standards for NO_2 and state ambient air quality standards for PM_{10} and SO_2 might be exceeded. As stated in Section 4.3.1, for the two years analyzed, no violations of Federal or state ambient air quality standards were predicted in the areas surrounding NPR-1 with one exception: off-site particulate concentrations (PM_{10}) under all cases are estimated to exceed the state ambient air quality standards for both years. 2001 No_x emission concentrations on-site are also expected to exceed Federal ambient air quality standards; while 2001 SO_2 concentrations and PM_{10} concentrations for both years on-site are estimated to exceed state standards. The on-site exceedances are expected to occur where the public does not have access.

Oil Spills

The fourth major impact from the future development of NPR-1 would be the slightly increased probability of an oil spill from the increased production of oil. Oil production is expected to increase beyond the Reference Case under any of the three alternatives considered, including No Action (Government Development Case). The probability of a spill would be roughly proportional to the production level. Assuming an increase in future oil spills corresponding to increased production levels, oil spill risk levels are not considered significant. Any spills are unlikely to reach any body of water and would be cleaned up in accordance with the Spill Prevention Control and Countermeasures Plan required by the operator, whether it is owned by the government or a commercial entity.

Water Resources

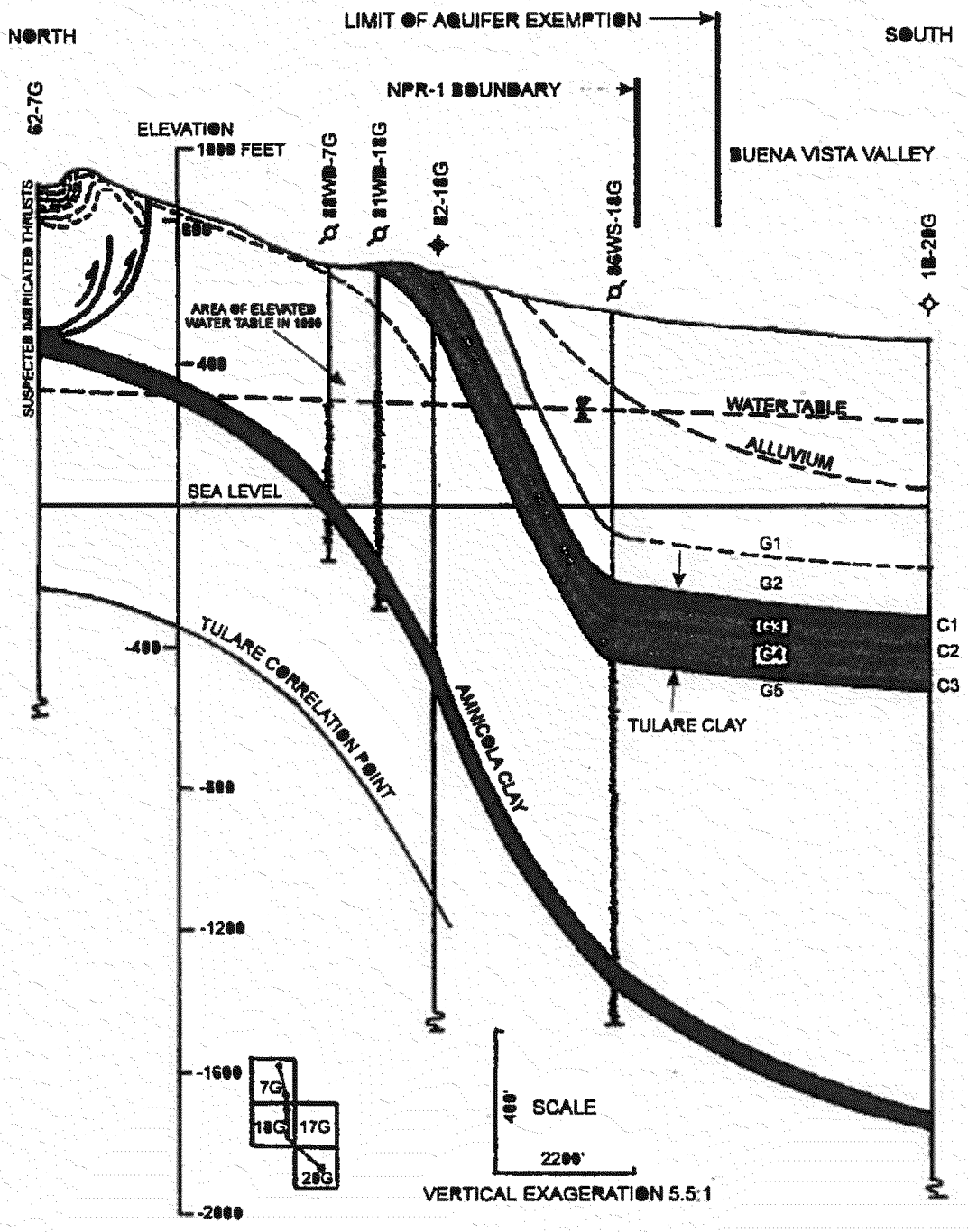
The last major impact from the future development of NPR-1 would be the potential impact on water resources under any of the three alternatives considered. The upper bounds of both the Government Development (No Action) and Commercial Development (Proposed and Alternative actions) cases would increase water demand for water flood enhanced oil recovery and increase produced waters requiring disposal. Fresh water is a critical resource in Southern California, and the demand for additional water as well as the small risk of contamination to groundwater supplies from produced water disposal are both significant potential impacts. These impacts, which would be roughly proportional to oil production levels, can be mitigated through the ongoing NPR-1 program to treat produced waters for use in water flood projects and through compliance with California Division of Oil, Gas, and Geothermal Resources standards for underground injection disposal of produced waters. The risk of contamination is also mitigated somewhat by the fact that local water quality is typically nonpotable due to high total dissolved solids levels.

Other Resources

Additional areas of potential concern are geology and soils, hazardous waste management and disposal, land use, noise, socioeconomics, energy conservation and environmental justice. These impacts are not likely to be significant and do not help distinguish among the alternatives.

Potential erosion impacts are greater under the Proposed and Alternative actions because larger areas would be disturbed. Common erosion control, revegetation, and soil rehabilitation practices should make these effects short-lived and localized, but residual effects would nonetheless be higher for these two alternatives than for No Action.

Figure 3.4-5
Structural Cross Section, South Flank of NPR-1 to the Buena Vista Valley



Portions of the Tulare Formation within the Elk Hills Field have been designated as an exempt aquifer by DOGGR because it is hydrocarbon-producing in the western part of the Reserve. A zone exemption does not necessarily include the entire vertical or lateral limits of a formation. The maximum zone exemption includes only the current productive limits of the field as set by DOGGR. The exempted portion of the aquifer coincides with the NPR-1 boundaries except in a few areas. The injection of produced wastewater into exempt portions of the Tulare Formation at NPR-1 has been occurring since 1981 (BPOI et al. 1995). In the period 1982-1992, between 60,000 to 100,000 BPD of produced wastewater have been injected into 19 wells. The location of these wells is shown in Figure 3.4-6 (DOE SEIS 1993). Approximately 70,000 barrels per day of produced wastewater are disposed in the southern flank of NPR-1 into the Tulare Formation (BPOI 1995). For NPR-2 (and the Buena Vista field in general), the producing horizons of the Tulare Formation are permitted for injection and are exempt aquifers.

In 1989, the CRWQCB, Central Valley Region adopted Resolution No. 89-098 as an amendment to the Water Quality Control Plan for the Tulare Lake Basin. This resolution designated all surface and groundwater within the Tulare Lake Basin that currently have no beneficial use designation as municipal and domestic supply (MUN) with the following exemptions (DOE EA 1994):

- The TDS exceeds 3,000 mg/l and CRWQCB does not reasonably expect the waters to supply a public water system. There is contamination, either by natural processes or by human activity unrelated to a specific pollution incident that cannot be treated for domestic use, using either Best Management Practices or best economically achievable treatment practices; or
- The water source does not provide sufficient water to supply a single well capable of producing an average sustained yield of 200 gallons/day.

3.4.4.3. Local Groundwater Quality

Since 1979, several wells have been completed in the Tulare Formation to supply water for enhanced oil recovery. There are five active source wells, and average daily source water withdrawal for Fiscal Year 1992 was 142,000 BPD (BPOI 1992). Water quality from these wells ranges from 4,482 to 6,142 ppm TDS (BPOI et al. 1995). A significant change in static water levels has not been observed downdip at the water source wells (Phillips 1992). The source wells are perforated in an interval such that a majority of the groundwater is withdrawn from that zone on the Tulare Formation located between the Tulare clay and the Amnicola clay (see Figure 3.4-6), which is the same zone into which most of the produced water is disposed at the injection wells updip (Phillips 1992).

A proactive program of groundwater monitoring is presently being conducted at NPR-1 on a voluntary basis. NPR-1 is not required to perform RCRA groundwater monitoring, and studies to date of NPR-1 disposal sites and CERCLA sites required by the State of California and DOE do not show groundwater contamination. The Groundwater Monitoring Plan for NPR-1 was completed in 1995 in accordance with DOE Order 5400.1 criteria. The plan includes monthly source well sampling; monitoring well design sitting; design and monitoring criteria; and methods to be applied in defining an NPR-1 hydrogeologic regime (BPOI et al. 1995). One of the objectives of this effort is to evaluate the potential for groundwater degradation to occur, especially from injection operations in the south flank, and from old sumps in the north flank area of NPR-1.

Page S-12

	regulations		
Impacts to ground-water quality off-site due to injection of produced water	◍ Annual injection of less than 51.3 MMB expected to cause less than significant impacts off-site. Groundwater monitoring in place needed to detect any potential migration and determine mitigation measures.	◍ Annual injection of less than 73.1 MMB (upperbound) expected to cause less than significant impacts off-site. Groundwater monitoring in place needed to detect any potential migration and determine mitigation measures	◍ Annual injection of less than 120 MMB (upperbound) expected to cause less than significant impacts off-site. Groundwater monitoring in place needed to detect any potential migration and determine mitigation measures
Impacts to wetlands	○ No jurisdictional wetlands	○ Same as Reference Case	○ Same as Reference Case

Legend

○ No Impact

⊕ Less Than Significant Impact

◍ Potentially Significant Unless Mitigation Incorporated

● Significant Impact

Page S-16

Impacts to ground-water quality off-site due to injection of produced water	⊕ Less than Significant Impact	⊕ Less than Significant Impact
Impacts to wetlands		

Page 4.4-8

4.4.2. Groundwater

4.4.2.1. Summary Of Impacts

This section analyzes potential impacts to groundwater. These impacts are classified into two major categories: impacts related to groundwater quantity and impacts related to groundwater quality. Section 4.4.2.2 describes the methodology for impact analyses. Sections 4.4.2.3 and 4.4.2.4 analyze impacts at NPR-1 and NPR-2, respectively.

The upper bounds of the Government and Commercial Development Cases are expected to have a continuous decrease of annual water requirements for their injection programs after 1999 and 2004, respectively. Existing and planned sources of water are expected to be able to cover water needs related to oil and gas development activities. The development of commercial activities in non-producing areas in Sale Scenarios 1 and 2 of the Proposed Action may require additional water.

The implementation of industry practices and stringent regulations of the California Division of Oil, Gas and Geothermal Resources (DOGGR) would reduce the significance of potential impacts to groundwater quality by well and pipeline construction. The geologic conditions of NPR-1 indicate that the potential for significant migration of contaminants off-site is small. Most produced water on NPR-1 is injected into the Tulare Zone, portions of which have been designated as an exempt aquifer for the purpose of Class II underground injection (meaning that Class II injection can occur without having to protect the Tulare Zone as an underground source of drinking water). The existing groundwater monitoring program would continue under any alternative to detect any potential migration off-site and determine response measures.

Page 4.4-13

Produced water. As part of oil and gas extraction, large volumes of produced wastewater are generated. Figure 4.4-3 presents the expected annual volumes of produced water for the period 1997 to 2034 for the Reference Case and the lower and upper bounds of the Government Development Case. As the field matures, and the number of water flooding projects increases, the volume of produced water increases. The maximum annual volume for the lower and upper bounds of the Government Development Case is 42.1 and 73.1 MMB in 2004 and 2007, respectively, as compared to the Reference Case of 51.3 MMB in 2004. The total dissolved solids (TDS) level of this wastewater is typically 20,000 to 40,000 ppm (DOE SEIS 1993). Most produced water on NPR-1 is injected into the Tulare Zone through several Class II permitted wastewater disposal wells. The Tulare Zone has been identified by the regulatory authorities as an exempt aquifer that does not have any beneficial uses other than as a potential source for oil-field waterflood operations. Geologic formations below the Tulare Zone contain saline water above 10,000 mg/l TDS and do not require protection as a drinking water aquifer under the Federal Safe Drinking Water Act. The hydrogeologic conditions indicate that the Tulare Zone is able to absorb the direct (and cumulative) impact caused by injection of produced water. The wastewater injection program is an activity regulated by DOGGR. When anomalies or issues arise concerning injection of produced water, NPR-1 works very closely with DOGGR to resolve such problems.

Page 4.4-15

volumes of injected water for the lower and upper bounds of the Government Development Case are 42.0 MMB (1999 level) and 68.1 MMB (2005 level), respectively, compared to a maximum volume of 51.2 MMB in 1999 for the Reference Case. There is a potential risk of groundwater contamination if an injection well were to fail mechanically or leak into surrounding waters. This risk is greater for injection wells than producing wells because operating pressures are greater. This risk, however, is minimal because injection wells are completed, tested and monitored according to state regulations. For example, injection pressures are kept at a safe level to protect the producing injection formations from fracturing and potentially providing a flow path to overlying groundwaters (DOE SEIS 1993). Furthermore, the groundwater aquifers penetrated by the injection wells are in UIC-exempt aquifers not suitable for drinking water.

Page 4.4-25

Regarding potential cumulative impacts to groundwater quality, as explained in Section 4.4.2.3, most of the produced water on NPR-1 is injected into the Tulare Zone through several permitted wastewater disposal wells. The Tulare Zone is an exempt aquifer which does not have any beneficial uses other than as a potential source for oil-field waterflood operations. The hydrogeologic conditions indicate that the Tulare Zone is able to absorb the impacts caused by injection of produced water. Groundwater migration between the Tulare Zone, where wastewater is injected, and the alluvium, from which higher quality water is extracted for agricultural, municipal and industrial purposes, is prohibited by a clay barrier (Milliken 1992). The alluvium is geohydrologically isolated from the Tulare Formation, and the potential for groundwater quality impacts outside NPR-1 should be minimal.

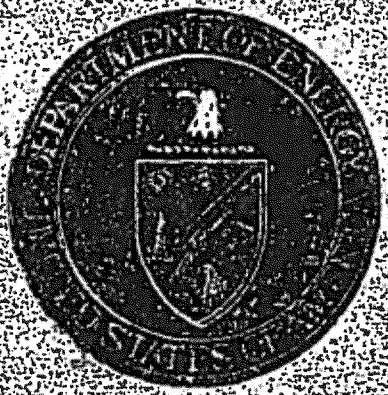
Page 4.4-18

In the Proposed Action, produced water would continue to be injected into the Tulare Zone, as in the No Action. The Tulare Zone, as explained in the discussion of produced waters under the No Action Alternatives, has been identified as an exempt aquifer to be used for this purpose, and the injection program would continue to be regulated by DOGGR. Monitoring of injection well operations and surface seeps would continue in the Proposed Action.

Elk Hills Power

Attachment E
Supplemental Environmental Impact Statement
DOE/EIS-0158
July 1993

Supplemental Environmental Impact Statement



DOE/EIS-0158

troleum Production at Maximum Efficient Rat
Naval Petroleum Reserve No. 1 (Elk Hills)
Kern County, California

July 1993

the injection wells are completed and monitored in accordance with the stringent laws, regulations, and DOE Orders that govern this activity, and because injection zones are deep and groundwater aquifers are relatively shallow, thus minimizing the potential for communication in the event the injection systems fail. The groundwaters at risk (i.e, those that are penetrated by the injection wells) are in UIC exempt aquifers where the quality of the groundwater is not suitable for use for potable water supplies.

As indicated above, plans are to intensify enhanced recovery operations. The impacts of these initiatives are discussed in Section 4.1.4.2.2 (planned facility development) under the enhanced recovery discussion.

Produced Water Disposal

As the field matures, continued production results in producing proportionally larger quantities of water. As a result of these circumstances and increases in waterflood injection quantities (described in Section 4.1.4.2.2), produced water is expected to increase from the current level of approximately 100,000-110,000 barrels/day to approximately 181,000 barrels/day in FY 1994 (see Table 1.2-1).

Disposal of produced water is currently being carried out in accordance with applicable laws, regulations and DOE Orders, under the authorities described in Section 3.4.2.4. Produced wastewater is disposed of primarily by injection into the Tulare Zone; currently this is approximately 80,000-100,000 barrels/day. Additional wastewater is disposed of by deep injection into producing zones - currently approximately 10,000 barrels/day. Some wastewater is disposed of by percolation/evaporation in open, lined and unlined sumps/secondary containment during off-normal situations (currently approximately 1,000-2,000 barrels/day). If these disposal methods continue to be utilized, given the quantities of wastewater forecast for the future, the impact on NPR-1 and adjacent groundwaters could be significant.

This is especially true for NPR-1 groundwaters in the Tulare Zone where wastewaters are being injected and sumped. However, even though the impact on NPR-1 groundwaters could be significant, the result is unlikely to be consequential since these groundwaters are in UIC exempt aquifers which are not known to have any beneficial uses other than as a potential source for oil-field waterflood operations (Smith 1986).

In addition to NPR-1 groundwater impacts, there is a potential that usable groundwaters along the periphery of the site could be affected. If wastewaters currently being released to unlined sumps (which overlie the Tulare Formation) have a flowpath above the water table to usable groundwaters near the margins of the site, and/or if the relatively poor quality NPR-1 groundwaters can flow into these usable groundwaters, then there is a possibility that past and/or ongoing wastewater disposal practices could degrade usable groundwaters. (NPR-1 groundwaters have and continue to receive wastewaters by injection into the Tulare and by sumping. In the past, some sumping was into unlined sumps near the Tulare/Alluvium contact). For additional information pertaining to NPR-1 groundwater impacts, and the potential for

of the water produced by the project does not meet current waterflood source water specifications for quality. As designed, the project would reduce by 50,000 barrels/day the amount of Tulare water currently being withdrawn as source water for the existing waterflood. Additional projects to accomplish the same objective are planned, pending the results of the first project. Assuming it proves technically and economically possible to recycle all wastewater for use as waterflood source water, this could involve recycling up to 181,100 barrels/day (see Table 1.2-1). Since the waterflood projects are projected to require up to 254,500 barrels/day (see Table 1.2-1), it would be necessary to obtain the balance of 73,400 barrels/day from the Tulare (254,000-181,100= 73,400).

Currently, the full amount of the waterflood of 148,000 barrels/day is provided from the Tulare. Therefore, it is possible that Tulare withdrawals could be reduced by as much as 74,600 barrels/day (148,000-73,400=74,600).

Source Water Withdrawal

If the PWI projects are unsuccessful, Tulare withdrawals would need to be increased from approximately 148,000 barrels/day to a maximum of approximately 254,500 barrels/day. Disposal of produced wastewater into the Tulare Formation would be a maximum of approximately 181,000 barrels/day. The resulting Tulare drawdown would be approximately 73,500 barrels/day (254,500 - 181,000 = 73,500). As discussed in Section 3.4.2.4 and Appendix D, Section D.4.2.2, this is comparable to historic operations which have been observed to have had no significant impact on the level or quality of the Tulare aquifer underlying NPR-1 or adjacent alluvial aquifers within the Alluvium in Buena Vista Valley.

Produced Water Disposal

As mentioned in Section 4.1.4.2.1, the waterflood and steamflood would contribute to increasing the amount of wastewater requiring disposal. This poses the same risks to groundwater that were discussed in that Section: i.e., the impact to NPR-1 groundwater is expected to be significant, but these waters are in a UIC exempt aquifer, they are poor quality, and except for oil-field waterflood operations, they have no known beneficial uses. In addition to impacts to NPR-1 groundwaters, there is also some possibility that wastewater disposed of on-site could migrate into usable groundwaters along the site periphery (see Section 3.4.2.3 and Appendix D). In recognition of this possibility, the following mitigation actions are in progress: to eliminate or minimize Tulare injection; to continue minimizing releases into unlined sumps; and, to evaluate NPR-1 groundwater regimes for the purpose of assessing and acting on the effects of past and ongoing activities, as appropriate. Discussion on the initiative to eliminate/reduce Tulare injection follows.

As mentioned in the enhanced recovery discussion above, the proposed action includes a project that has been constructed to recycle approximately 50,000 barrels/day for the purpose of reducing wastewater requiring disposal and to provide source water for future waterflood projects; this project is in the start-up phase which is expected to require an extended period of

DOE - See U.S. Department of Energy

Filley, T. H., 1989, Argonne National Laboratory, Argonne, Ill., memorandum to file -- phone log of conversation with B. Carmical, West Kern Water District, Taft, California.

Fries, K. G., 1993, Preliminary Evaluation of U.S.Fish and Wildlife Service National Wetland Inventory Maps of NPR-1, prepared for Department of Energy, Research Management Consultants, Inc., Naval Petroleum Reserves in California, Tupman, California.

Golder Associates, Inc., 1990, NPR-1 Groundwater Monitoring Plan Prepared for Bechtel Petroleum Operations, Inc., Tupman, California, May 15.

Smith, Scott, 1986, Staff Engineer, California Regional Water Qualtiy Control Board, Central Valley Region, memorandum to William Plister, Senior Engineering Geologist, Regional Water Quality Control Board, May 30.

U.S. Department of Energy, 1992, Total Planned Quality Maintenance Plan, U.S. Department of Energy, Naval Petroleum Reserves in California, Tupman, California, June.

*Copies of correspondence and unpublished documents cited in this list are available upon request from James C. Killen, Manager, Technical Assurance, U.S. Department of Energy, Tupman, California 93276.

Elk Hills Power

Attachment F
Conference Notes

CONFERENCE NOTES
ENVIRONMENTAL PROTECTION AGENCY, REGION IX
DEPARTMENT OF ENERGY, NAVAL PETROLEUM RESERVES IN CALIFORNIA
San Francisco, California

Date: January 14, 1993
Recorded by: Ken Fries

MEETING ATTENDANCE:

EPA	DOE	BPOI
Dr. Jacqueline Wyland	Jim Killen	Rick Donahoe
Jeanne Geselbracht	Maurice Fishburn	Dr. Russ Trimble
Dave Farrel	Mark Milliken	
Nicole Moutoux		

RMCI	CUSA
Mike Phillips	Jim Waldron
Ken Fries	

BACKGROUND:

The U.S. Environmental Protection Agency (EPA) in July, 1992 provided substantive comments regarding the NPR-1 Draft Supplemental Environmental Impact Statement (DSEIS). Of greatest significance were recommendations that DOE-NPRC develop a fourth (hybrid) alternative and delay publication of a Record of Decision (ROD) on the document until verification of the first phase of the Produced Water Injection (PWI) project occurred. EPA also commented on a number of other issues, the most important of which concerned the disposition of the associated NPR-1 Section 7 consultation with the U.S. Fish and Wildlife Service (FWS). DOE-NPRC prepared draft responses to EPA's comments and provided same to EPA for review in December, 1992.

This meeting was requested by DOE-NPRC to establish a working relationship with EPA and to provide EPA an opportunity to respond informally to the draft comment responses. Jim Killen, Mark Milliken, and Russ Trimble gave oral presentations at the meeting to enhance EPA's understanding of NPR-1 facilities and operations, produced water disposal practices, and ultimate hydrocarbon recovery, respectively. Hard copies of the presentations, along with additional support materials, were provided to all EPA participants.

MEETING SUMMARY:

The format of the meeting consisted of the above presentations, which stimulated questions from EPA and subsequent discussions. Questions posed during Jim Killen's presentation addressed the following topics: Disposition of NPR-1 oil production (SPRO?, DOD?); explanation of the SOZ steamflood and PWI projects; status of the NPR-2 environmental assessment; drilling fluid waste disposal at the 27R landfarm; and, the relationship between the concept of "Maximum Efficient Rate (MER)" and the proposed action.

Questions asked by EPA during Mark Milliken's presentation addressed the following subjects: Elk Hills Tulare Formation aquifer exemption for class II disposal under the Underground Injection Control Program; hydrocarbon levels in NPR-1 produced wastewater; well construction and operation permits from the Division of Oil and Gas; groundwater modelling to determine off-site flow in future years; and the rationale for placing water source wells down-dip from produced water disposal wells.

Russ Trimble's presentation resulted in questions on the following subjects: Cost/benefit analyses to determine MER projects; time scale of the oil/water curves; the difference in NPR-1 oil reserve estimates as given by Jim Killen and Russ Trimble; and the possibility of shutting in certain NPR-1 reservoirs for some period of time.

Open dialogue and additional questions ensued following the conclusion of the above presentations. Jeanne Geselbracht inquired about the status of the ongoing Section 7 consultation with FWS and asked the names of the FWS representatives involved. She also asked about DOE-NPRC's willingness to commit to FWS terms and conditions and conservation recommendations that will be included in the Biological Opinion. Jeanne also inquired about the NPR-1 revegetation program.

EPA offered little comment regarding the meetings' principal issues (analysis of a fourth alternative and verification of the PWI prior to publication of a ROD). They did offer some advice and future assistance to DOE-NPRC in completeing the NEPA process. First, Dr. Wyland offered to review and comment on a preliminary FSEIS, even if it is provided to them one section at a time. EPA <u>will</u> provide formal comments when the FSEIS is released and Dr. Wyland strongly suggested that we provide adequate review time to consider all comments prior to publishing a ROD. Dr. Wyland mentioned cases where project proponents have included additional mitigation, severed portions of a proposed action, or committed to operational changes in the ROD as a result of FSEIS comments. Dr. Wyland also stated that it is important from an appearance standpoint to provide adequate time to consider FSEIS comments prior to issuing a ROD.

CONCLUSION:

The meeting concluded with both parties agreeing to work together during the remainder of the NEPA process. DOE-NPRC stated their willingness to consider EPA concerns on the comment responses, but indicated that plans are to send the final document to DOE Headquarters in February for release approval and to publish the ROD by May or June.

Dr. Wyland commended DOE-NPRC on the professionalism of the presentations and the hard copy materials that were provided. Dr. Wyland and Dave Farrel both stated that they learned a great deal about NPR-1 operations.

DISTRIBUTION:

DOE	CUSA	BPOI	EG&G	RMCI
W. Dunbar	J. Brady	J. Watson	T. Kato	W. Gautreaux
D. Hogan	J. Waldron	R. Trimble		V. DiPasqua
J. Williams	J. Monarch	R. Donahoe		M. Phillips
W. Kauffman	D. Vroom	C. Valentino		K. Fries
J. Killen		D. Champion		
M. Fishburn		G. Gough		
M. Milliken		T. Mele		
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